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WEATHER DAMAGE TO COTTON

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LOSSES FROM WEATHER DAMAGE

Annual waste from weather damage to raw cotton can be measured in millions of dollars. Informal estimates have placed the figure anywhere between $25,000,000 and $75,000,000. A great part of this loss occurs while the cotton is in the hands of farmers, as buyers, shippers, and merchants usually place the cotton in proper storage immediately upon purchase.

Losses from weather damage in the last three seasons have been much less than formerly. Under boll-weevil conditions, the picking season has been shortened and reaches its conclusion at an earlier date. Prices which have prevailed during this period have contributed to an early movement of the crop from the producer into the channels of trade, where facilities for protection are generally ample. Farmers' warehousing facilities have increased somewhat in number, and the value of cotton has been a factor in encouraging their use. Moreover, weather conditions have been more than ordinarily favorable during the months when the crop was in the stage rendering it most susceptible to damage. The indefinite continuance of such a combination of circumstances, however, can not be expected. It is important, therefore, that the risks involved in the open storage of cotton should not be lost to sight.

The findings of the experiments here described should be useful in combating the prevalent belief, especially on the part of farmers, that the exposure of baled cotton to unfavorable weather does not reduce the value of the product. The data emphasize the desirability of storing cotton in proper warehouses immediately after ginning and point out the best method of storing cotton in the open when it is necessary to do so.

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"Weather damage," as here used, means damage resulting to the cotton fibers on account of an excess of moisture. The fibers first become discolored from mildew and, when this condition is not corrected, they decay. Cotton frequently "weather damages" in the field before it is picked and when stored in the seed or left on the ground after picking it may be seriously damaged by an excess of moisture. Likewise, bales that are sound and dry when put up at the gin will become damaged if they are excessively wet when compressed.

Losses from various causes, including weather damage, are sometimes referred to as "country damage;" for example, the mutilation of bales by excessive sampling, tearing the bagging while handling the bales, etc. It seems that the expression originated at the ports and was used in a broad way to designate any damage that might have occurred to the cotton before it reached the port. This damage might have occurred on the plantation, at the gin, on the cotton yard, at the local warehouse or compress, in transit, or even at the ports themselves. The use of the term "country damage" should be discouraged, for it is indefinite and misleading, and it has a tendency to reflect unduly on the farmer, who frequently is not responsible for the damage to the cotton.

To protect cotton from weather damage, it is of the greatest possible importance that the bales be kept from contact with the ground or any other moist object. Cotton should be thoroughly matured and dried out before it is ginned. If cotton is ginned while wet, the staple will probably be "gin cut" and otherwise damaged, and the resulting bale will have an excess of moisture. This will probably result in serious damage to the bale. When it is impossible to place the cotton in a warehouse immediately, the bales should be placed on poles and turned often.

CAUSES OF WEATHER DAMAGE

There are two stages or degrees of weather damage: (1) The cotton becomes mildewed. In this stage the fiber is not necessarily materially weakened, but the chief damage lies in the lowering of the grade because of the stain or discoloration which reduces its value. (2) The second stage is reached when the effect is sufficiently serious to cause decay of the fiber by fungi. Decay seriously weakens the fiber and reduces its spinning value. If the process of decay is permitted to continue very long, the fibers lose both their individuality and their spinning value.

There is a noticeable seasonal variation in weather damage. During reasonably cold weather there is comparatively little decay in baled lint cotton. But as warm weather approaches, bales of cotton that have been permitted to absorb moisture begin to damage very rapidly unless they are promptly and thoroughly dried out. Consequently, the most serious damage occurs in warm weather.

WET SEED COTTON

The original source of weather damage may sometimes be traced to moisture in seed cotton. Occasionally, when picking cotton, many "green" bolls (bolls that have not dried out since opening) are picked. Such damp or green bolls have an excess of moisture; and

if the cotton is ginned before being dried out, the resulting bale will have an excess of moisture and therefore will be likely to weather damage. This applies also to cotton that is picked immediately after a rain or while there is a heavy dew on it, to seed cotton piled on the ground as it is picked, and to unprotected seed cotton which may have been rained upon when in the field or on the way to the gin. If such cotton is ginned before being thoroughly dried, the resulting bale will be excessively wet and subject to weather damage.

Leaky press cylinders are sometimes responsible for wet or water-packed bales, which are likely to become damaged unless they are opened and dried out, or unless the wet cotton is removed from the bales.

WATER ABSORBED BY BALES

The packing of damp lint cotton, though serious, is not so prevalent a cause of weather damage as the absorption of moisture by the baled cotton after leaving the gin. Bales of cotton are fre-

FIG. 1.—A typical cotton yard in a small town. Similar yards are found in hundreds of interior shipping points. Baled cotton is sometimes thus exposed to weather damage, fire hazard, and theft for weeks while awaiting sale or shipment

quently exposed on the ground at the gin yard, on cotton yards, at farm houses, on river banks, awaiting shipment by river steamer, or on compress and freight platforms. Under such conditions rain or snow falls directly upon the bales and much moisture is absorbed from the ground, from improperly drained concrete or earth floors of warehouses, from damp walls, from railroad or compress platforms, etc. (fig. 1).

Wet cotton is frequently loaded into a box car for shipment. If it remains in the car for any considerable length of time, damage is likely to occur. This is also true of wet cotton packed or piled in a warehouse or in the hold of a boat where the cotton can not dry properly. Leaky roofs in warehouses, compresses, and sheds are sources of considerable complaint.

The capillarity of a bale of cotton in contact with moisture is very great. When a bale lies flat on the wet ground, moisture is

usually absorbed rapidly. In the tests described later it is shown that practically all of the damage occurred on the bottom of the bales. This part of the bale has ordinarily little opportunity to dry out.

In some instances owners have been known to expose baled cotton to the weather intentionally, to increase the weight. This practice is not honest and sooner or later it results in damage to the bale if it is exposed long enough.

All of the tests show a direct relationship between the amount of moisture absorbed and the resulting damage. Since the fungi responsible for the discoloration and decay of the fibers thrive best under temperate conditions, the cotton in the tests damaged at a much more rapid rate during the spring and summer months.

Too much emphasis can not be placed upon the desirability of placing baled cotton in a properly constructed warehouse, under responsible managment, as soon after ginning as possible. When this practice becomes established, the annual loss from weather damage will be largely eliminated.

If it is impracticable to place the bales in a commercial warehouse, they should be stored in a dry place out of the weather or, as a last resort, they should be edged up on poles and turned at least once each week.

PRACTICAL TESTS

Six tests have been conducted by the United States Department of Agriculture at five representative points in the Cotton Belt to determine the seriousness of the damage that baled cotton suffers when exposed to weather. To determine as far as possible to what extent there is a sectional variation in the extent or degree of weather damage, the tests were made at representative points in the Cotton Belt.

The location and dates and duration of the several tests are as follows:

(1) Little Rock, Ark., November 25, 1918, to June 7, 1919.
(2) Raleigh, N. C., November 20, 1918, to June 9, 1919.
(3) Dallas, Tex., December 23, 1919, to August 3, 1920.
(4) Raleigh, N. C., January 15, 1920, to August 24, 1920.
(5) Jefferson, Ga., January 10, 1920, to August 26, 1920.
(6) Dunn, N. C., December 13, 1921, to July 31, 1922.

The bales were kept under close observation and weighed after each rain or once each week to determine the rate of absorption under varying weather conditions.

Seven bales of cotton were used in each test. One bale was stored in the warehouse and the remaining six were exposed to the weather (fig. 2). The positions of the bales and the conditions of exposure were as follows:

Bale No. 1. Fully protected in a warehouse.

Bale No. 2. Uncovered on poles, edge up, and turned after each rain or once a week.

Bale No. 3. On poles, covered by tarpaulin, without further attention.

Bale No. 4. Flat on the ground during entire test; same surface down at all times.

Bale No. 5. On end on the ground during entire test; same surface down at all times.

Bale No. 6. On edge on the ground during entire test; same surface down at all times.

Bale No. 7. On edge on the ground and turned after each rain or once a week.

Careful records were kept of time, position, location, absorption, damage, and other factors that might in any way affect the amount of loss. At the end of the period of exposure the bales were placed in a warehouse and the bands removed. When the bales had become reasonably dry, the damaged cotton was removed, or "picked," as a part of a reconditioning process, in much the same way that cotton is reconditioned commercially. After the damaged cotton was removed, the remaining good cotton was weighed to determine the amount of loss the bales had suffered during the tests.

It was found that the unprotected bales that were placed with their flat surfaces next to the ground without turning suffered an average

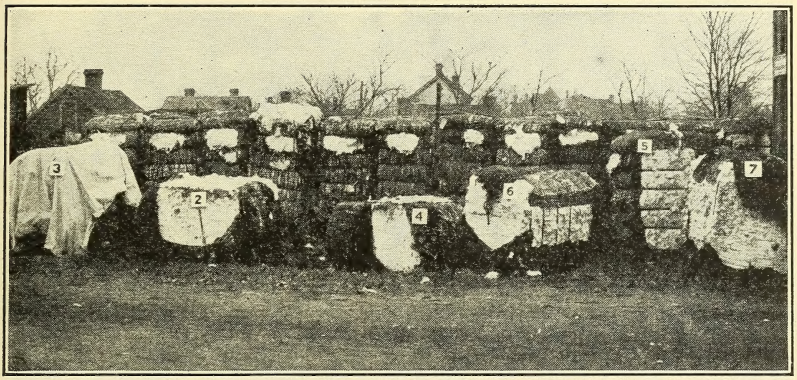

FIG. 2.—Placing of bales in the test. This arrangement of exposed bales in test No. 4 at Raleigh, N. C., is typical of the arrangement in the six tests. The other bale, No. 1, was stored in a warehouse

loss of 273.5 pounds per bale, or 54.7 per cent of their original gross weight. The bales placed on poles and protected by a canvas cover lost 10 pounds per bale, or 2 per cent of their orignial gross weight. The data also make clear that, where no protection is available, the loss can best be held down by placing the bales on poles and turning them once a week, or at least after each rain. The bales handled in this way lost an average of 19.5 pounds, or 3.9 per cent of their original gross weight.

In some instances it was necessary to put new covering on the bales; and in a few instances it was necessary to repack the cotton entirely, for there was not enough undamaged cotton left to make a commercial bale.

DETAILS OF PRACTICAL TESTS

Test No. 1 was conducted at Little Rock, Ark., in the yard of a compress company in North Little Rock. This lot of cotton was first exposed on November 25, 1918, and was placed in the warehouse for drying on June 7, 1919. As shown in Table 1, bale No. 4 suffered

a loss of 47.2 per cent and bale No. 5, a loss of 23.8 per cent. Bale No. 1 in the warehouse lost 0.4 per cent, or 2 pounds, because of drying out in storage.

Test No. 2 was conducted at Raleigh, N. C. (Table 2). The bales were set out on November 20, 1918, and opened for drying on June 9, 1919. In this test bale No. 4 showed a loss of 43.5 per cent and bale No. 5, a loss of 19.2 per cent.

Test No. 3 was conducted at Dallas, Tex. (Table 3), beginning December 23, 1919, and terminating August 3, 1920. The time covered in the test was somewhat greater than in former tests and the damage was greater. The proportion, however, is about the same.

Test No. 4 was conducted at Raleigh, N. C. (Table 4), extending over a period from January 15, 1920, to August 24 of the same year. This test was started later than the test in Dallas, Tex., and continued later. The only outstanding difference to be noted here was the serious damage to bale No. 4, the greatest loss so far noted. The

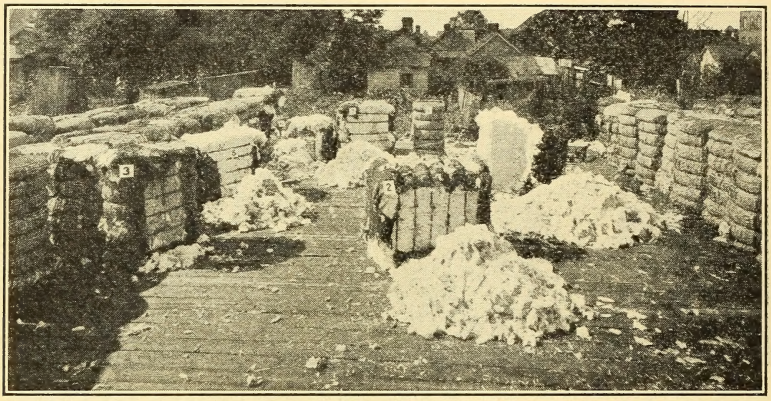

FIG. 3.—Bales used in test No. 4 during reconditioning. The damaged cotton has been "picked" from all of the bales except No. 4. The damaged cotton or "pickings" have little commercial value

damage to bale No. 7 was comparatively heavy. This is especially noticeable, since this bale absorbed comparatively little water (fig. 3).

Test No. 5 was conducted at Jefferson, Ga. (Table 5) from January 10, 1920, to August 26 of the same year. The outstanding feature of this test was the very severe damage to bale No. 4—370 pounds, or over 73 per cent of its original weight. The losses to bales 6 and 7 were rather heavy, too, while No. 5 lost considerably less than most of the corresponding bales in other tests.

Test No. 6 was conducted at Dunn, N. C. (Table 6), beginning on December 13, 1921, and ending on July 31, 1922. Through an error, there was no bale No. 6 in this test. There was an apparent gain in bales Nos. 2 and 3. This may be largely explained by the fact that the bales used were shipped from a comparatively dry area (Wills Point, Tex.), and the gain may represent moisture absorbed in the more humid climate of eastern North Carolina.

The outstanding feature of this test was that there was no loss by bales 1, 2, and 3, which was as it presumably should be, and the loss

in bale No. 7 was very small. The losses by bales 4 and 5 are in line with losses on similar bales in the other tests. All bales on the ground and not turned after rains suffered severely.

Table 7 is a summary of the results of the six tests.

TABLE 1.—*Weather damage test, Little Rock, Ark., November 25, 1918, to June 7, 1919*

[For position of bales, see p. 4]

Date of weighing	Weight of bales by number on specified dates							Rainfall between dates of weighing
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	
1918	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Inches*
Nov. 25	494	487	489	492	505	503	495	
Dec. 2	495	481	489	496	509	507	496	0.79
Dec. 9	497	486	490	500	511	507	498	.00
Dec. 16	498	489	492	506	519	512	502	1.52
Dec. 23	498	493	493	512	523	516	505	.76
Dec. 30	500	496	492	512	525	519	508	.54
1919								
Jan. 6	500	494	492	521	525	516	505	5.70
Jan. 13	498	493	491	517	524	516	502	.16
Jan. 20	501	496	495	533	535	523	510	1.27
Jan. 27	503	493	494	532	537	522	507	.69
Feb. 3	502	493	491	540	544	525	510	.47
Feb. 10	502	492	491	543	546	524	508	.50
Feb. 17	501	490	490	555	545	522	502	1.25
Feb. 24	501	491	490	557	543	522	501	1.16
Mar. 3	499	489	486	560	548	519	500	.17
Mar. 10	500	492	489	603	567	535	507	1.71
Mar. 17	500	496	490	665	497	552	510	3.19
Mar. 24	497	488	488	628	562	526	497	.00
Mar. 30	500	487	489	662	582	538	499	1.54
Apr. 7	497	486	487	663	573	537	498	.39
Apr. 14	496	485	484	684	580	539	495	.94
Apr. 21	494	480	481	664	563	526	490	.15
Apr. 28	496	484	482	664	560	532	496	.35
May 5	497	483	484	732	600	542	495	2.26
May 12	498	496	487	825	665	577	513	1.21
May 19	497	486	485	818	655	570	501	1.19
May 26	498	487	487	840	647	575	503	.71
June 2	500	493	488	880	700	615	514	1.56
June 7	500	495	488	912	677	605	512	.51
Weight at beginning of test, and total rainfall	494	487	489	492	505	503	495	30.69
Weight after reconditioning	492	480	485	260	385	432	473	
Loss in weight	2	7	4	232	120	71	22	
Percentage loss in weight	*Per cent* 0.4	*Per cent* 1.4	*Per cent* 0.8	*Per cent* 47.2	*Per cent* 23.8	*Per cent* 14.1	*Per cent* 4.4	

TABLE 2.—*Weather damage test, Raleigh, N. C., November 20, 1918, to June 9, 1919*

[For position of bales, see p. 4]

Date of weighing	Weight of bales by number on specified dates							Rainfall between dates of weighing
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	
1918	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Inches*
Nov. 20	488	473	475	481	479	475	485	
Nov. 25	487	479	479	490	485	481	492	0.07
Dec. 2	487	485	478	500	497	487	496	1.56
Dec. 9	486	477	480	487	487	483	490	.16
Dec. 17	486	500	484	518	501	500	506	3.01
Dec. 23	486	503	487	523	512	500	515	.70
1919								
Jan. 1	487	502	488	524	513	499	516	.31
Jan. 7	486	492	479	518	508	498	509	.70
Jan. 13	487	488	477	515	505	496	505	.00
Jan. 20	487	487	478	525	510	500	510	.84
Jan. 27	486	494	472	532	511	499	509	1.60
Feb. 5	485	500	475	550	524	507	514	.57
Feb. 17	485	481	476	540	512	500	505	.69
Feb. 24	486	490	479	545	517	506	511	.49
Mar. 3	486	494	483	548	521	511	514	.77
Mar. 10	486	501	485	554	525	515	516	1.31
Mar. 17	486	500	484	547	530	516	512	.07
Mar. 24	486	506	486	545	527	514	508	.05
Apr. 7	485	497	490	549	526	513	512	1.13
Apr. 14	483	493	488	546	523	511	513	.37
Apr. 21	483	491	486	544	521	513	515	.94
Apr. 28	484	494	487	545	524	515	516	.05
May 5	485	501	492	577	529	519	521	.92
May 12	485	505	496	647	534	524	526	1.65
May 19	486	517	497	700	540	537	539	2.21
May 26	485	518	494	741	547	540	536	1.40
June 4	485	528	496	824	620	576	564	.09
June 9	483	507	474	732	605	561	514	1.47
Weight at beginning of test and total rainfall	488	473	475	481	479	475	485	23.13
Weight after reconditioning	479	444	464	272	387	390	422	
Loss in weight	9	29	11	209	92	85	63	
Percentage loss in weight	*Per cent* 1.8	*Per cent* 6.1	*Per cent* 2.3	*Per cent* 43.5	*Per cent* 19.2	*Per cent* 17.9	*Per cent* 13.0	

TABLE 3.—*Weather damage test, Dallas, Tex., December 23, 1919, to August 3, 1920*

[For position of bales, see p. 4]

Date of weighing	Weight of bales by number on specified dates							Rainfall between dates of weighing
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	
1919	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Inches*
Dec. 23	562	544	553	534	553	569	546	
Dec. 30	564	540	550	532	550	565	542	
1920								
Jan. 6	561	559	562	558	574	595	558	
Jan. 13	563	549	562	546	562	584	550	1.92
Jan. 20	564	543	555	540	555	573	546	.01
Jan. 27	562	545	561	544	557	580	548	1.76
Feb. 3	563	544	559	540	555	570	547	.00
Feb. 10	564	549	564	550	560	580	555	.23
Feb. 17	563	542	559	550	555	570	548	.56
Feb. 24	560	540	555	535	552	566	541	.00
Mar. 2	559	531	551	536	550	565	543	.00
Mar. 9	560	532	550	535	550	564	542	.00
Mar. 16	557	532	543	533	547	559	534	.12
Mar. 23	554	530	542	532	545	559	535	.00
Mar. 30	553	531	541	543	552	562	532	4.48
Apr. 6	555	528	542	542	554	565	532	1.02
Apr. 13	553	530	543	545	555	569	532	.93
Apr. 20	554	531	542	544	554	567	530	.00
Apr. 27	552	528	542	549	555	573	533	1.19
May 4	550	528	540	550	555	574	533	.57
May 10	550	528	542	549	556	574	533	6.07
May 17	555	555	580	637	640	652	586	6.28
May 24	554	536	567	631	625	622	565	.00
June 1	554	535	565	630	620	619	564	.00
June 8	553	534	566	628	619	617	560	2.48
June 15	553	534	565	627	617	615	560	.00
June 22	553	532	560	625	618	617	561	1.64
June 29	551	533	562	627	617	615	562	.17
July 6	551	535	567	625	618	619	560	.00
July 13	550	527	542	680	619	576	548	.83
July 20	551	535	560	720	645	625	560	.73
July 27	551	540	565	800	660	635	565	.00
Aug. 3	551	541	578	920	693	676	570	1.21
Weight at beginning of test and total rainfall	562	544	553	534	553	569	546	32.20
Weight after reconditioning	551	500	532	294	399	447	478	
Loss in weight	11	44	21	240	154	122	68	
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	
Percentage loss in weight	0.2	8.1	3.8	44.9	27.8	21.4	12.5	

TABLE 4.—*Weather-damage test, Raleigh, N. C., January 15, to August 24, 1920*

[For position of bales, see p. 4]

Date of weighing	Weight of bales by number on specified dates							Rainfall between dates of weighing
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	
1920	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Inches*
Jan. 15	485	470	480	471	493	483	498	
Jan. 19	485	474	482	480	500	487	503	0.82
Jan. 28	486	486	488	502	515	498	517	2.26
Feb. 2	485	482	486	498	511	494	512	.16
Feb. 9	486	477	486	485	500	490	505	3.00
Feb. 16	486	482	484	494	506	495	500	1.54
Feb. 23	486	488	486	504	515	500	505	.30
Mar. 2	486	479	485	490	502	491	500	.65
Mar. 8	483	477	485	492	505	496	503	.96
Mar. 15	484	482	487	496	509	500	508	1.20
Mar. 22	484	480	487	493	504	497	504	.69
Mar. 29	484	484	489	499	508	500	496	.52
Apr. 6	483	473	480	517	503	492	500	.89
Apr. 12	483	476	481	521	506	494	503	.54
Apr. 20	484	479	483	525	507	497	506	.27
Apr. 26	483	484	487	530	513	503	511	.77
May 3	480	465	472	565	520	516	500	1.08
May 10	480	460	472	569	516	509	496	.24
May 17	482	467	472	583	522	493	495	.41
May 24	479	470	470	582	515	485	495	.35
May 31	479	467	470	579	511	480	489	.03
June 7	480	473	473	566	518	486	495	1.80
June 15	478	470	471	591	523	482	490	.11
June 21	478	475	470	705	590	580	519	2.40
June 28	478	471	469	715	600	573	503	.52
July 4	477	470	463	713	598	568	499	.19
July 12	477	500	467	750	660	615	545	1.26
July 19	478	505	470	763	672	640	563	2.05
July 26	479	507	471	765	670	642	565	2.50
Aug. 2	478	510	468	801	672	620	540	.19
Aug. 9	478	516	470	807	678	627	545	1.68
Aug. 16	479	535	483	847	699	637	553	1.38
Aug. 24	478	562	480	920	720	685	603	.42
Weight at beginning of test and total rainfall	485	470	480	471	493	483	498	31.18
Weight after reconditioning	476	438	460	170	335	378	396	
Loss in weight	9	32	20	301	158	105	102	
Percentage loss in weight	*Per cent* 1.9	*Per cent* 6.8	*Per cent* 4.2	*Per cent* 63.9	*Per cent* 32.0	*Per cent* 21.7	*Per cent* 20.5	

TABLE 5.—*Weather-damage test, Jefferson, Ga., January 10, to August 26, 1920*

[For position of bales, see p. 4]

Date of weighing	Weight of bales by number on specified dates							Rainfall between dates of weighing[1]
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	
1920	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Inches*
Jan. 10	471	499	490	506	484	491	505	
Jan. 19	473	496	491	513	482	496	509	0.75
Jan. 26	476	519	495	537	503	515	530	2.00
Feb. 2	477	499	492	517	485	498	512	1.05
Feb. 9	477	499	492	522	487	500	515	1.70
Feb. 16	477	496	491	521	484	499	512	1.60
Feb. 23	477	500	491	531	490	505	517	1.80
Mar. 1	475	490	487	520	480	495	508	.70
Mar. 8	475	490	486	522	480	495	507	.90
Mar. 22	476	493	486	537	482	500	510	4.87
Mar. 29	475	493	486	564	486	505	511	2.87
Apr. 5	473	492	486	576	487	506	514	2.22
Apr. 12	474	493	485	592	490	508	515	1.37
Apr. 19	473	493	487	623	497	518	515	1.60
Apr. 26	473	490	481	638	495	520	510	1.80
May 3	473	502	480	685	515	541	526	1.17
May 10	473	482	478	642	492	520	505	.09
May 17	473	490	483	707	512	544	519	3.20
May 24	474	483	480	684	500	532	508	.00
May 31	473	480	479	675	496	526	506	.30
June 7	473	479	477	676	497	527	506	.50
June 14	471	470	474	643	487	510	498	.00
June 21	471	484	477	760	510	537	514	1.80
June 28	472	478	475	755	503	530	506	.80
July 5	471	475	475	705	492	518	502	.02
July 12	472	479	477	765	503	535	515	1.35
July 19	472	493	478	765	509	545	523	.40
July 26	470	476	475	760	495	535	510	.51
Aug. 2	471	473	474	720	488	522	506	.20
Aug. 16	474	514	481	960	550	635	570	4.00
Aug. 26	478	508	480	1,065	538	626	552	2.10
Weight at beginning of test and total rainfall	471	499	490	506	484	419	505	41.67
Weight after reconditioning	470	480	476	136	406	324	395	
Loss in weight	1	19	14	370	78	167	110	
Percentage loss in weight	*Per cent* 0.2	*Per cent* 3.8	*Per cent* 2.9	*Per cent* 73.1	*Per cent* 16.1	*Per cent* 34.0	*Per cent* 21.8	

[1] Record of precipitation as kept by those conducting tests.

TABLE 6.—*Weather damage test, Dunn, N. C., December 13, 1921, to July 31, 1922*

[For position of bales, see p. 4]

Date of weighing	Weight of bales by number, on specified dates						
	No. 1[1]	No. 2	No. 3	No. 4	No. 5	No. 6[2]	No. 7
1921	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Dec. 13	530	526	508	538	514		528
Dec. 19		529	512	549	520		535
Dec. 26		529	514	548	519		535
1922							
Jan. 2		539	518	560	530		545
Jan. 9		535	518	555	524		540
Jan. 23		539	520	570	532		553
Jan. 30		540	518	567	534		545
Feb. 6		540	521	574	542		547
Feb. 13		535	514	565	534		542
Feb. 20		534	514	569	538		542
Feb. 27		534	514	571	536		543
Mar. 27		534	513	589	549		544
Apr. 3		533	513	587	537		544
Apr. 10		528	510	582	535		533
Apr. 17		524	509	578	533		530
Apr. 24		528	512	580	537		540
May 1		528	511	579	534		541
May 8		529	510	686	585		532
May 15		523	511	709	589		530
May 22		518	510	750	600		535
May 29		522	510	798	610		536
June 5		535	520	810	621		541
June 12		541	522	841	637		547
June 21		530	510	905	685		540
June 26		526	507	808	664		535
July 3		530	509	865	669		530
July 10		534	512	904	692		536
July 17		537	510	938	673		541
July 24		545	519	1,033	622		566
July 31		541	517	1,026	618		558
Weight at beginning of test	530	526	508	538	514		528
Weight after reconditioning	530	540	519	240	405		500
Loss in weight		[3] 14	[3] 11	298	109		28
		Per cent	*Per cent*	*Per cent*	*Per cent*		*Per cent*
Percentage loss in weight		[3] 2.7	[3] 2.2	55.4	21.2		5.3

[1] In previous tests bales stored in warehouses remained practically unchanged in weight. Therefore, the weighing of bale No. 1 was omitted.
[2] Through an error, bale No. 6 was not included in the test.
[3] Gain.

TABLE 7.—*Percentage loss in weight of cotton bales for the six tests and calculated loss in pounds*

Bale number	Test No. 1 (Little Rock, Ark.)	Test No. 2 (Raleigh, N. C.)	Test No. 3 (Dallas, Tex.)	Test No. 4 (Raleigh, N. C.)	Test No. 5 (Jefferson, Ga.)	Test No. 6 (Dunn, N. C.)	Average	Calculated loss per 500-pound bale
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Pounds*
1	0.4	1.8	0.2	1.9	0.2	0.0	0.8	4.0
2	1.4	6.1	8.1	6.8	3.8	[1] 2.7	3.9	19.5
3	.8	2.3	3.8	4.2	2.9	[1] 2.2	2.0	10.0
4	47.2	43.5	44.9	63.9	73.1	55.4	54.7	273.5
5	23.8	19.2	27.8	32.0	16.1	21.2	23.4	117.0
6	14.1	17.9	21.4	21.7	34.0	[2]	21.8	109.0
7	4.4	13.0	12.5	20.5	21.8	5.3	12.9	64.5

[1] Gain in weight.
[2] No test.

It will be seen that the loss was small on bales 1, 2, 3, and 7 in all tests. The average loss on bale No. 4 was very great, over 54 per cent, and the loss on bale No. 5 averaged 23.4 per cent (fig. 4).

A comparison between bales 6 and 7 shows that the turning of bale No. 7 resulted in reducing the probable loss 44.5 pounds. Comparing bales 4 and 5, it would appear that standing bale No. 5 on

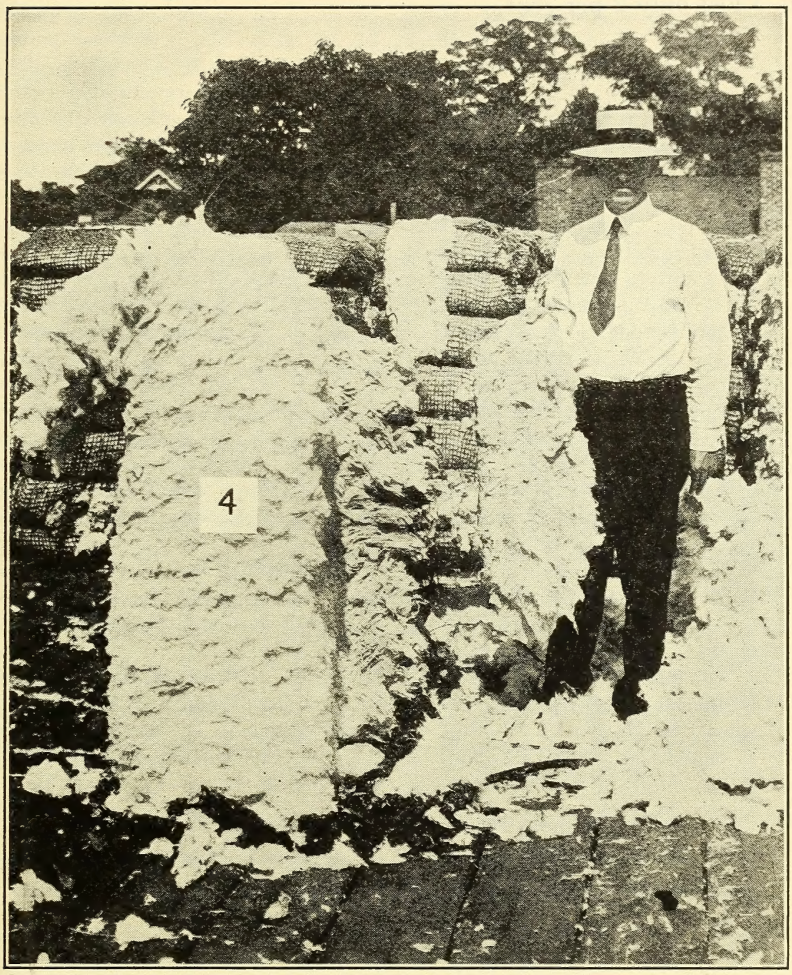

FIG. 4.—Bale No. 4 (test No. 2) during the process of "picking" or reconditioning. Only a portion of the damaged cotton has been removed so as to show the depth of the damage. (The damaged cotton is compact, while the cotton not damaged is fluffy.) This bale lost 209 pounds, or over 43 per cent of its gross weight as a result of the exposure (See Table 2)

end reduced the damage on it 156.5 pounds, or more than 55 per cent of the probable loss if the bale had been laid flat on the ground. Referring to bales 2 and 3, it is apparent that the damage is small when bales are placed on timbers to keep them from coming in contact with the ground and when the bales are turned after each rain or, preferably, are covered with canvas. As was to be expected, the

weight of the bale that was stored in the warehouse was practically the same at the beginning and at the end of the experiment.

From an original total weight of 17,622 pounds not stored in warehouses there was a loss of 3,505 pounds. To state the fact differently, there was a loss of 7 full bales from an original lot of 35 bales, and 12 of these 35 bales were kept under very favorable conditions. The six stored bales lost an average of less than 1 per cent. Bale No. 3 lost only 2 per cent.

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